

Camera FV-5

The official user guide

WELCOME TO CAMERA FV-5
WILLKOMMEN BEI CAMERA FV-5
BIENVENIDO A CÁMARA FV-5
ようこそ CAMERA FV-5へ



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Based on Camera FV-5 version 2.3

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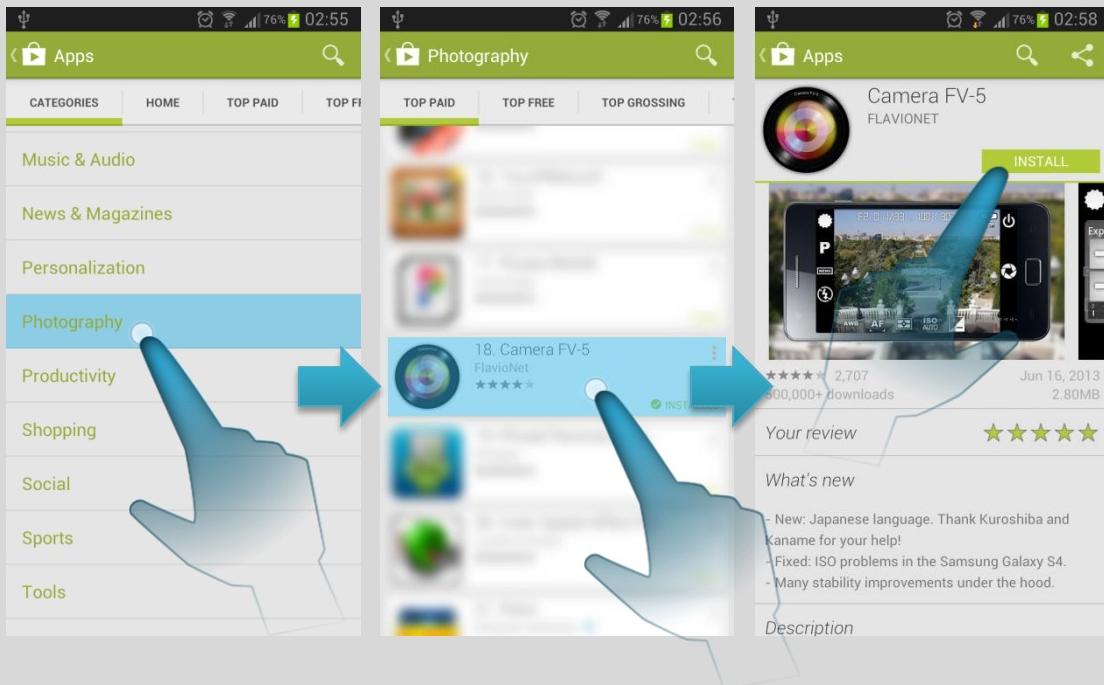
Introduction

Camera FV-5 is an advanced camera application for Android devices. Currently it runs on mobile phones, tablet computers and Android-powered cameras. It brings the camera control typical from advanced point&shoot and DSLR cameras, control that is missing from stock firmware and OEM camera applications. It squeezes every ounce of your camera by providing a unique hardware abstraction layer that it is able to control camera modules of more than 2000 phones, tablets and standalone cameras. All devices are supported by the same application. Given the big differences among all the devices Camera FV-5 is able to run on, the controllability of those devices also varies significantly. This is discussed through this manual.

Tailored to enthusiast and professional photographers, with this camera application you can capture the best unprocessed photographs so that you can post-process them later with as much quality as possible and get stunning results. The only limit is your imagination and creativity!

Getting Camera FV-5

Camera FV-5 is available through Google Play, the marketplace for Android applications. Google Play is preinstalled on all Android devices. You can find Camera FV-5 on the top positions of the “**Photography**” section, as well as searching for “**Camera FV-5**”.



There are two versions of Camera FV-5: **Camera FV-5 Lite** and **Camera FV-5** (paid version). Both versions are essentially the same, with **the only difference being the resolution limitation on the free Lite version**. Therefore you can try the application

without any time limitations and see if the application works properly and fits your demands before buying the full paid application.

Regardless of the version of the application you download, you have access to frequent downloads. You get those updates by either manual download (you get notifications on the Android notification drawer when updates become available) or automatically if you decided to do so. It is recommended that you select automatic application updates. You always get the most stable version and newer features without having to care to download updates manually. After each update, a dialog will tell you what's new on the updated version (new features, bug fixes and improvements). Application updates are also free once bought the paid version as well. Therefore, buying the application is a one-time payment, granting you access to all future updates at no extra cost.

Furthermore, when you buy the application, **you can install Camera FV-5 on all your Android-powered devices at no extra cost**. To do that, be sure to always download the application using the same account you used for buying it on the first place. On that case, you won't be prompted to pay again each time you install the application on the same or other devices you might own.

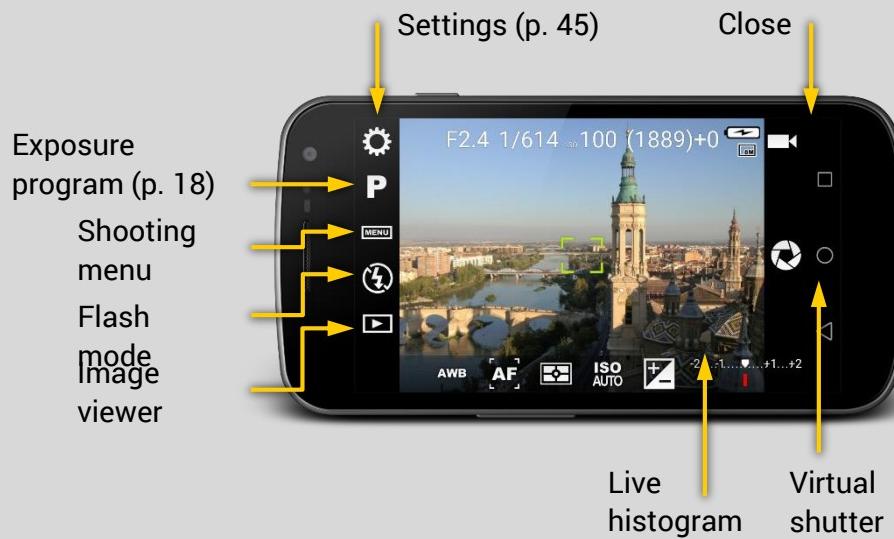
Obtaining support

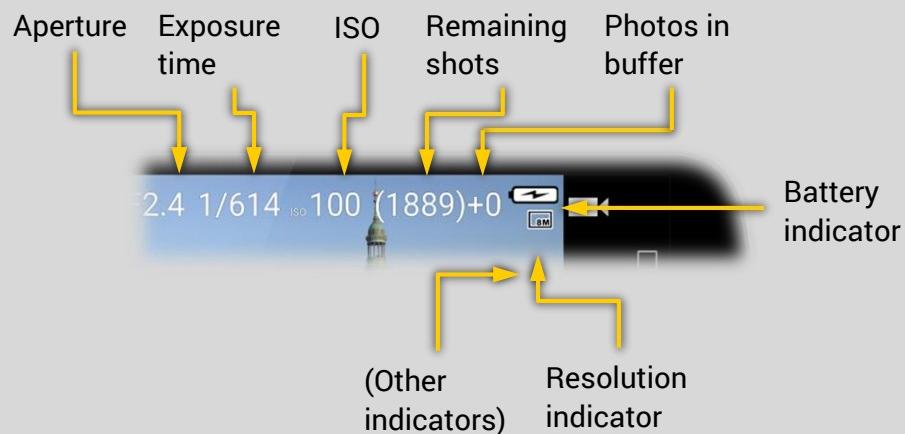
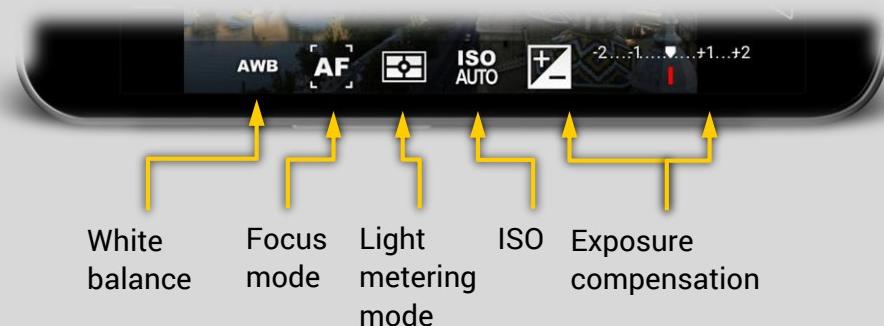
For any problem related to Camera FV-5, you can contact to the support team via e-mail: support@cameravf5.com. However, before contacting the aforementioned e-mail address for support, please visit the Frequently Asked Questions (FAQ) here: <http://www.cameravf5.com/faq.php>, as it is really likely that your questions is already answered there.

If you require help with photographic-related concepts, there are many resources online for general photographic concepts as well as tips, suggestions and techniques. One of my favorites is *Cambridge In Colour* (<http://www.cambridgeincolour.com/>). It contains multiple tutorials in many categories that go from basic photographic concepts to advanced techniques, and from the camera to the computer techniques to edit the photographs. It is a very worth read!

Basic commands

Camera FV-5 puts all the controls and options—that you would typically find on dedicated physical buttons on a high-end DSLR camera—directly on the screen. Adjusting the ISO, the metering mode or the white balance is just a tap away. All the controls are located around the viewfinder.





Shutter button



Located on the right of the viewfinder, is the virtual counterpart of the shutter button on traditional cameras. It can replicate all the functionality of a physical shutter button. However, if your device has a physical shutter button, you can also use it to take photos.

Virtual shutter button

The virtual shutter button emulates a physical shutter button. Since the virtual shutter button cannot react to half-presses like physical two-stepped buttons, the normal operation –tapping on the virtual button– always takes a picture. However, the default behavior is to trigger autofocus, and then take the picture (that is, the picture is not taken immediately but only after the focus has been acquired).

There are two settings to override this behavior:

- The normal behavior is to cancel the action of taking a picture if the autofocus result was unsuccessful (that is, the autofocus routine didn't achieve a sharp subject or couldn't locate the focus position, both situations lead to a red focus rectangle). If you want Camera FV-5 to take a picture in any case (whether the focus succeeded or not), activate the option *Settings > General camera settings > Allow taking a photo without focus*.
- If you simply don't want to trigger autofocus before taking a picture (that is, you want to take a picture without changing the focus position), activate the option *Settings > General camera settings > Focus before capturing*.

Note

If the focusing routine fails, the default behavior is not to take the photo. The focus rectangle turns into red in this case. You can change this behavior in *Settings > General camera settings > Allow taking a photo without focus* although it is discouraged, as the resulting photo could be incorrectly focused.

Physical shutter button

If your phone has a physical shutter key, you can use it to take photos with Camera FV-5. Save for the zoom (when not assigned to volume keys) and any other manual controls, you can take photos without having to ever use the touch screen.

There are two types of shutter keys:

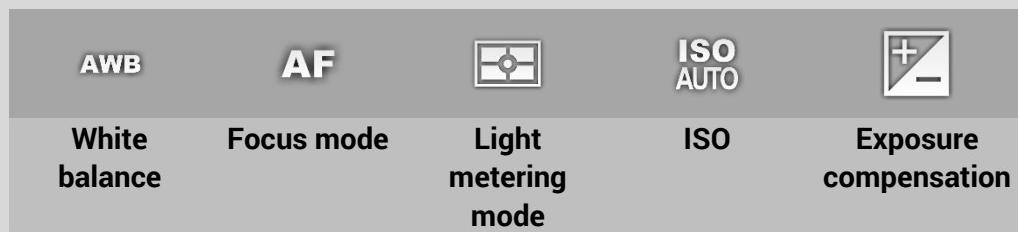
- **With two steps.** Those shutter keys have two depths: you can press it slightly until the middle (half-press) and then continue until the end (full-press). When you half-press the shutter key, Camera FV-5 focuses the picture and then locks the focus, meaning that you can

reframe your shot and the focus distance will remain. When you finally fully-press the shutter key, the picture is taken.

- **With one step.** On that case, the physical shutter key will behave the same way as the virtual shutter button.

Main photographic controls

The main photographic controls –exposure compensation (EV), ISO, light metering mode, focus mode and white balance (WB)– are always available at the bottom of the screen. Changing those parameters is a breeze: they are just two taps away, and you always get a preview of the effects reflected on the viewfinder.



Tip

You can reset altered photographic parameters to their defaults by long-pressing on their corresponding buttons. The device will produce a short vibration to confirm that the setting was reset to its default and the icons will also reflect the change. White balance is reset to AWB, focus mode to AF, metering mode to matrix, ISO to Auto and exposure compensation to +/- 0.

Exposure compensation (EV)

Adjust the compensation of the exposure time. A value of +1 effectively doubles the exposure time, whereas a value -1 halves the exposure time. The EV range and step vary across devices. A range of [-2, 2] and a step of $\frac{1}{2}$ stop is typical. If exposure bracketing (BRK) is enabled, the exposure compensation will compensate the bracketing exposures, and the bracketing number of pictures and step will limit the EV range. Read more on this on chapter *Automatic exposure bracketing* (p. 37).

Sensor sensibility (ISO)

Select the ISO value: automatic (AUTO) or in the range from ISO 50 to ISO 3200, depending on the device (some sensitivities may not be available, or may take no effect if Camera FV-5 is unable to detect the available ISO range of your device).

Light metering modes

Select which zones to use from the picture to meter light. The available options are:



Matrix. Use all zones to meter light.



Center. Use the central part of the picture to meter light.



Point. Use the area of the focus rectangle when it is centered on the viewfinder. In case you are using touch-focus (i.e. the focus rectangle is not centered) the metering point will still be centered. If you want point metering, but not centered, you can use **touch metering** (if available).



Touch metering. Allows you to select the metering point from any point on the picture. This option is only available on devices whose camera hardware supports this feature. The metering point is chosen by long-pressing on the viewfinder (if touch-metering is not available, long-pressing on the viewfinder will have no effect). Then, a metering rectangle will appear. This rectangle can be dragged around the viewfinder with the finger once is placed on a specific position. You can reset the metering mode by selecting any of the other metering modes (matrix, center or point).

AE-L

Auto-exposure lock. Stops the automatic exposure algorithm, keeping the last automatic exposure time calculated while the lock is active. Tap the toggle again to unlock. Supported only on Android 4+ devices with the appropriate support from the camera hardware.

Focus mode

You can choose from one of the following focus modes, plus a focus lock switch.

AF

Autofocus. Focus anywhere on the picture. Focus priority depends on camera maker. Tap anywhere on the viewfinder to trigger AF.

MF

Manual focus. Available only on Android 5+. The focus rectangle is hidden, and you can slide vertically the finger over the viewfinder to adjust manually the focus position between infinity and macro.



Macro. Gives AF system a hint to prioritize closer objects. On some devices, effectively lowers the allowed minimum focusing distance.



Face detection focus. The focus rectangle is hidden, and the focus is automatically adjusted to be positioned on faces, that are automatically detected in real time in the viewfinder.



Touch focus. Gives AF system a hint to focus on the selected object. Tap anywhere on the viewfinder to select the focus point and trigger AF. Touch focus, under Android 2.x, is only available on some Motorola, HTC and Nvidia camera drivers, plus some Samsung drivers. Android 4.0+ it is always supported.



Continuous autofocus. The focus is automatically and continuously adjusted according to the camera autofocus mode criteria.



Infinity. Set the focus to infinity. Tapping on the screen always result in focus confirmation and AF is not triggered.



Autofocus lock. Locks the focus at the current position. Tap the toggle again to unlock.

White balance (WB)

You can compensate white biasing because of different illuminant temperatures. As of now, you can choose from different presets (ordered from warmer to colder temperatures):

AWB

Automatic. The camera calculates the temperature of the light source present on the scene and automatically compensates it.



Cloudy.



Sunny.



Fluorescent light.



Warm fluorescent light.



Incandescent light.

Note that preset white balance settings depend on device manufacturer support.

On Android 4+ devices you can lock the automatic white balance algorithm.

WB-L

Auto white balance lock. If the white balance is set to auto, when the toggle is active, the automatic white balance algorithm will stop running, keeping the last calculated scene temperature. Tap again the toggle to unlock it and recalculate the scene color temperature.

Program modes, shooting utilities and flash settings

At the left side of the viewfinder, from top to bottom, the following settings are located:

P

Program mode. Here you can see the current selected exposure program mode and change it by tapping on it and selecting a new one from the popup menu. Read more on chapter *Exposure program* (p. 18).

MENU

BRK



Shooting utilities. Contains different shooting utilities.

- **Automatic exposure bracketing.** Takes pictures with different exposure compensations. Read more on chapter *Automatic exposure bracketing* (p. 37).

- **Intervalometer.** Takes picture series and timelapses. Read more on chapter *Intervalometer* (p. 34).

- **Self-timer.** Takes pictures after a predefined time interval. You can tap on this mode to select 2, 5 or 10 seconds delay, as well as to deactivate the self-timer. When the self-timer is active, tapping on either the virtual or physical shutter button takes the picture after the predefined interval. This mode can be useful (but not only) for:

- Taking self-portraits.
- Taking photos on a tripod in low light conditions avoiding the blur caused by the finger moving the camera when activating the shutter button.

- **Image stabilization.** Activates or deactivates the image stabilization. On most devices, this is digital image stabilization. If image stabilization is not supported on the device this button might not be present.





- **Burst mode.** Activates or deactivates the burst mode. When the burst mode is active, tapping and holding the virtual shutter button or the shutter key (if the device has one) will result in a continuous flow of photos being taken, as long as the virtual shutter button or the shutter key are not released.



- **Touch capture mode.** Activates or deactivates the touch capture mode. When this mode is active, after tapping anywhere on the viewfinder, the camera will take a photo immediately. This can be useful in two scenarios:

- Take *selfies* with the rear camera. You can point the rear camera to you, and then tap anywhere on the screen. Camera FV-5 will adjust focus as usual (depending on the current focus mode) and then will capture a photo. Since you cannot see the screen in this case, the touch capture mode helps you to take the photo by tapping anywhere on the viewfinder.
- Take effectively photos of moving objects when using touch focus mode. When taking pictures of moving objects, the delay between tapping on the subject to focus on that position and take the photo might be enough for the object to move and the focus to be lost. When using touch capture mode, the photo will be taken immediately after setting the focus position, reducing the possibility of missed focus.



Flash mode. Lets you choose the flash mode. Depending of the type of the flash unit and the device, the available options are:



- **Automatic.** The flash is fired if the camera considers the lighting conditions require additional illumination.



- **Always on.** The flash is always fired regardless of lighting conditions.



- **Always off.** The flash is never fired even if the scene is poorly lit.



- **Slow sync.** The flash is fired in slow sync mode. In slow sync mode, the exposure time is adjusted as if the flash wasn't going to be fired. This captures

extra light from the background of the subject while the flash is used to freeze the main subject.



- **Red eye.** The camera fires the flash twice. The first time (the pre-flash) uses a low power discharge to cause the iris of the eyes present on the photo to close, minimizing the effect of red eyes when the main, full-power flash fires and the camera captures the photo.



- **Red eye fix.** The flash fires as usual but the camera removes red eyes from the picture digitally (locating them and replacing the color with black).



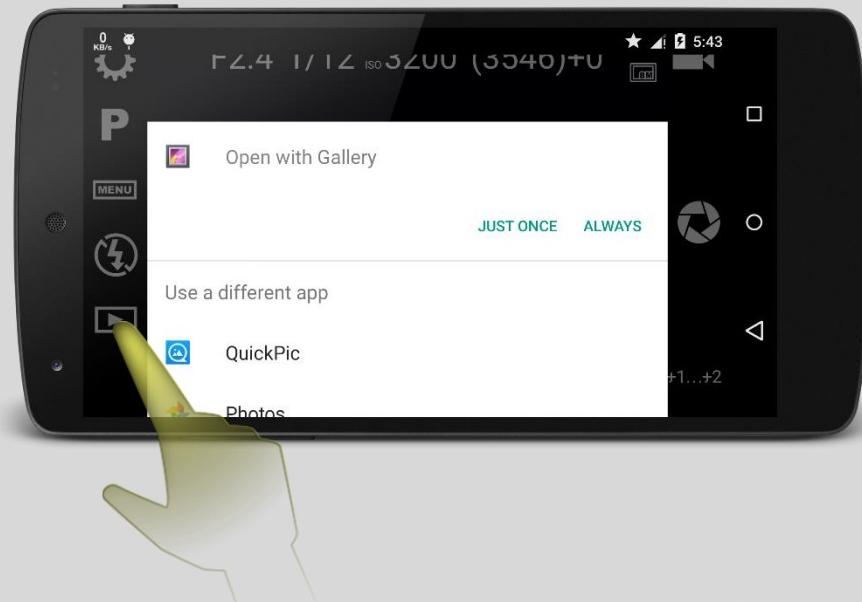
- **Continuous.** If the flash is of LED type, the flash is permanently turned on, allowing you to preview the effect of the flash on the final photo while you frame it. This option is not available if the flash is of xenon type.

If the device lacks a flash unit, the flash mode button will be hidden.

Image review

Although Camera FV-5 doesn't have a built-in image viewer, it can invoke any external image viewer you have installed on your system. By default, almost any Android device have the Gallery application preinstalled. Other phones have also the Photos app by Google. In any case, you can preview the last image taken on any of these external application, and then you can either come back to Camera FV-5 or you can flick over all the other pictures besides the last one.

In case there are more than one application available to view images on your phone, you will see a dialog that lets you choose which application you can to use. Furthermore, you can either use one application just once, or assign this application as the default one for viewing images.



In case you choose to do so, you can reset the association on *Android settings > Application manager / Apps > All > [Current default gallery application] > Launch by default > Clear defaults.*

Settings button

Arguably the second most important button on Camera FV-5 –after the shutter button of course— is the settings button. It opens the settings panel, where you can adjust the rest of the settings of Camera FV-5 not present on the main screen. Operation with the settings panel is usual for the advanced photographer, and it provides extensive configuration of your camera. Photo encoding settings, photo organization options, advanced photographic parameters or viewfinder adjustments are just some of the options found on the settings panel. The settings panel is discussed in detail on chapter **Settings reference** (p. 45).

Exposure program

Like on cameras with manual exposure controls, you can find on Camera FV-5 the typical PSAM exposure programs. However, those are only available on real cameras, like the Samsung Galaxy Camera. On mobile phones only P and S are available.

Each exposure program lets you either control exposure time or aperture or both, and let Camera FV-5 calculate the remaining parameters automatically to achieve a correct exposure.

Those 4 program modes are:

- **P. Program.** Exposure time and aperture are automatically chosen. You can however adjust other camera parameters, like ISO for instance. You don't have to worry about exposure time and aperture while in this mode.
- **S. Speed priority.** You can set the exposure time and ISO and/or aperture (if available) will be automatically calculated for a correct exposure. A basic shutter speed selection dialog is available in Android 4.4 and older, while a newer and more advanced dialog is available for Android 5.0 and newer, as well as in some devices even running an older Android version¹.
- **A. Aperture priority.** Only available on real cameras that sport iris blades, lets you adjust manually the lens aperture. The exposure time will be automatically calculated and set for a correct exposure.
- **M. Manual.** Only available on real cameras, lets you adjust manually both exposure time and aperture. On this mode, you can get over or

¹ The advanced shutter speed selection dialog is available on full-compatible Android 5.0 devices, but also on the Samsung Galaxy Camera, Samsung Galaxy Camera 2, Samsung Galaxy S4 Zoom and HTC One (2014, M8).

underexposed photos, since both parameters are set by the user, and you can select exposure times and apertures that in combination produce photos with “wrong” lightning (in photography there’s nothing wrong or right when it comes for exposures, since that wrong exposure might be the one you are looking for, for specific effects or artistic purposes).

All exposure parameters are reflected on the viewfinder as closely as possible, with the exception of the manual exposure time on mobile phones. Other exposure parameters like long exposures on real cameras of 5” and longer are sometimes not correctly displayed, since the camera cannot predict how the image will look like after such a long exposure time.

Program

In Program mode, both exposure time and aperture are automatically selected. While you don’t need to worry about those parameters, you are still allowed to tweak other parameters that might affect the exposure, like the ISO, light metering, exposure compensation, etc. If the exposure compensation is disabled (that is, it is set to 0) you always will get photos “correctly” exposed (that is, according to the camera, not you, that’s the reason of the existence of exposure modes that allow you to override camera’s automatic decisions).

Speed priority

Lets you set the exposure time manually. There are two different versions of the dialog for setting the exposure time depending on which device you are running Camera FV-5 on.

Mobile phones running Android 4.4 KitKat or older



On mobile phones running Android 4.4 KitKat or older, there is no specific exposure time control (like in fractions of seconds) like traditional cameras, given a limitation of the operating system and closed camera drivers. Therefore, the only available options for setting the exposure time are some presets.

- **Short.** Forces a short exposure time suitable for handheld shooting. On most devices this gives 1/30s or shorter.
- **Long.** Forces a long exposure. On most devices, this gives $\frac{1}{2}$ of a second to 1" exposure time.
- **Long+.** Forces a longer exposure. On most devices, this gives 1" to 2" exposure time.

There are also some presets for long exposure (1", 2" and 5") but you can also manually select the exposure time from 0.3 to 60" with an accuracy of 0.1 seconds. Those open shutter modes are actually digitally composed long exposure photos that don't provide the same quality as true long exposure provided by real cameras. Also, the photo resolution on this mode drops to 1 MP to 2 MP depending on the device, because the live view is used to produce the long exposure photograph.

Mobile phones with Android 5.0 Lollipop or newer, and
Android-based compact cameras



The dialog simply provides an exposure time scale where you can select manually the exposure time. The range of exposure times you can select is device-dependent, the same for the number of steps between the maximum and minimum exposure times. The exposure times are shown as fractions of seconds up to 0.4", and then as decimal numbers onwards. The exposure time scale is logarithmic.

Aperture priority



Aperture limit based on
current focal length

Lets you set the lens aperture manually.

Note

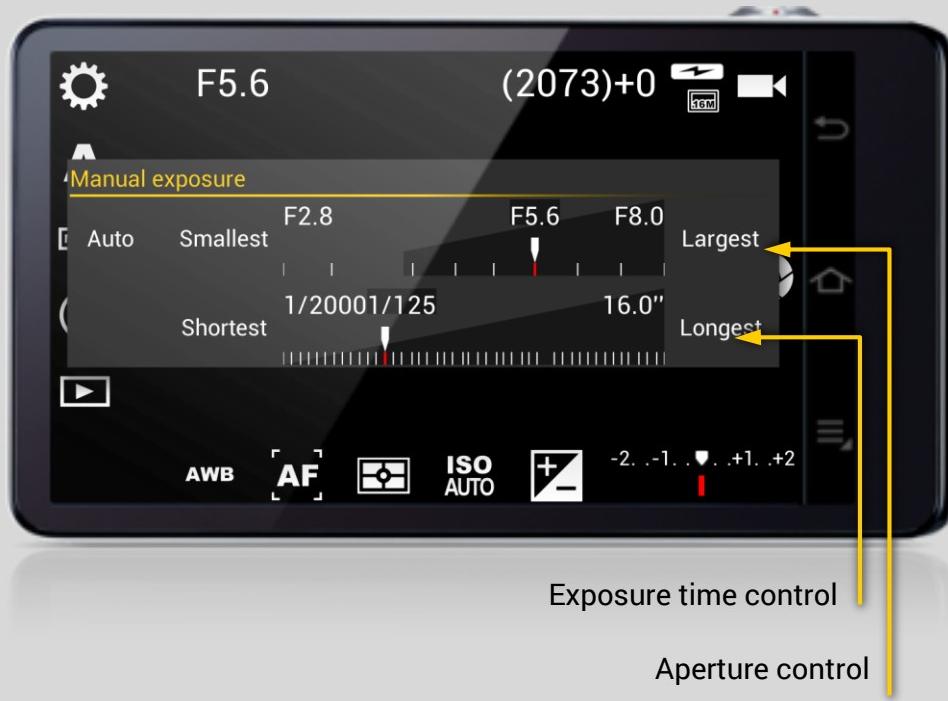
The Aperture priority mode (A) only applies to real cameras (not mobile phones). The aperture is not adjustable on mobile phones because mobile camera modules have a fixed aperture. The aperture of the lens depends approximately on the diameter of the lens. Conventional cameras with adjustable aperture have blades that close or open to reduce or increase the amount of light reaching the sensor, respectively. Those blades usually have the look of the virtual shutter icon button that used on the app, but ironically, mobile phones doesn't have such blades, nor any kind of device that is able to close the diameter of the aperture. Therefore, the aperture is inherently fixed on those camera modules, and therefore, no application will be able to control the aperture. The aperture (F-number) shown is queried to the camera driver, and it is also the maximum aperture, as, given the diameter of the lens, cannot be larger, without building the lens differently.

The range of apertures available depends on the characteristics of the lens. You can drag the marker over the aperture scale to adjust the aperture F number. The selected value will be displayed on the top of the viewfinder.

Note

The maximum aperture (minimum F/number) you can select depends on the actual focal length (zoom value). You can see the maximum aperture you can select on the aperture scale.

Manual



The dialog lets you select both the aperture and the exposure time simultaneously. Therefore depending on the specific combination you choose you can end up with underexposed or overexposed photos. Both the exposure time and aperture scales are the same as in their individual selection dialogs. You can preview the final exposure in the viewfinder as soon as you adjust the scales.

The viewfinder

The viewfinder is comprised of a live camera sensor view (that updates in real time to all photographic parameter changes) with additional information and composition guides overlaid on top. On the upper part of the viewfinder you can see the actual camera parameters –aperture, exposure time, ISO–, the remaining shots on the current selected media and the buffer status. On the right many indicators are shown. Finally, there are a number of composition guides overlaid on top that can be activated at any time.

Furthermore, you can activate a live histogram, which is a very powerful exposure guide. Unlike most cameras, that display this information at photo review, Camera FV-5 can provide you a live histogram (both full RGB and luminance) that update in real time, giving you a very useful information to judge the photo's exposure.

Upper display

On the upper display you can see the photographic parameters like exposure time, aperture and ISO and the buffer/storage information.

F2.0	Aperture. This serves as a reference only on mobile devices, since the aperture in Android mobile devices is fixed and thus cannot be adjusted. On real cameras supporting aperture adjustment, this reflects the current selected aperture in aperture priority mode or manual exposure mode.
1/33	Exposure time. This shows the exposure time being used, displayed as a fraction of a second, or in decimal format for longer exposures.
ISO 100	ISO value (sensitivity). This shows the selected ISO value, or the automatically chosen value, in case ISO Auto is selected.

[3025]	Remaining shots in memory card. This value is an approximate value of the remaining shots calculated based on the selected storage medium, the selected resolution and picture format (JPEG or PNG). In some devices the value is more accurate than others, since JPEG compression hardware in different devices perform different and give smaller file sizes given the same quality level.
+0	Photos in buffer. Photos are processed and developed in the background as you continue with camera operation and picture taking. When taking a photo, it is stored in the buffer, and they are processed one-by-one in the background. If enough RAM is available, raw photos are stored in memory to be processed. When no more memory is available, internal memory is used to store pending pictures. Therefore, the amount of pictures in the buffer depends on internal memory size. RAM memory typically stores around 2 or 3 photos, whereas internal memory can hold hundreds. Camera FV-5 keep processing photos even if you close the camera application, and you should see buffer status next time you open the application, in case that there were still pending photos in the buffer.

Indicators

The main interaction with the camera takes place through the viewfinder. A part from framing the picture, all the controls and displays are laid out around the viewfinder.

On the top part:

	Battery indicator. Shows in a 5 segment battery indicator the approximate remaining battery charge available.
	Location fix indicator. If the location tagging is enabled in Settings, when a location is available, this indicator is shown. Only if the indicator is displayed, location information will be written to photo metadata.
	Burst indicator. Displayed when burst mode is activated. If burst mode is active, tapping-and-holding the capture button or holding down the camera hardware button will result in a continuous stream of photographs being captured and queued in the buffer.
AF-L	Autofocus lock indicator. Displayed when the focus lock is active. To release the lock, tap on  on focus toolbar.

AE-L	Auto exposure lock indicator. Displayed when the auto exposure lock is active. To release the lock, tap on AE-L on light metering modes toolbar.
AWB-L	Auto white balance lock indicator. Displayed when the auto white balance lock is active. To release the lock, tap on WB-L on white balance toolbar.

On-screen composition aids

Two different on-screen composition aids can be activated via the settings panel: **composition grids** and **crop guides**. Those are found in *Settings > Viewfinder > Overlays*.

Composition grids

Light grids that aid during framing and scene compositing. They are very helpful for framing good and aesthetically pleasing photos.

Rule of thirds	The simplest of all grids. Display a grid that subdivides the frame in 3x3 cells. Interesting objects, people and edges should lay in the grid intersections or along edges of the grid.
One quarter	Like the previous one, but the frame is subdivided in 4x4 cells.
Crosshair	A simple grid (2x2 cells), useful to keep horizontal features horizontal, and vertical features vertical.
Triangles	Two types: topleft-bottomright and bottomleft-topright.
Golden spiral	Four directions: top right, bottom right, top left, bottom left.

Crop guides

Allow you to frame objects as if the frame had actually a different aspect ratio as the picture size you have selected. That way, you can use the typical native 4:3 aspect ratio of the sensor to get the maximum output resolution, but frame as if you had, for instance, 3:2 aspect ratio. You can later crop the image to the aspect ratio you used for composition, but if you change your mind, you always have the full resolution shot to keep it or frame (crop) it another way.

Crop guides, when active, show the unused part of the image with a darker semi-transparent overlay. Note that the image is not actually cropped to the selected aspect ratio, crop guides (as the name implies) are just guides for cropping later.

When the composition grids are active, they adapt to the highlighted area left by the selected crop guide.

Square format	Keeps a centered square on top of the viewfinder, to aid you in framing square shoots.
3:2	That is the typical aspect ratio of DSLRs. Selecting this crop guide, you can frame your shots with 3:2 aspect ratio, while shooting in 4:3. If you really want your photos to come out already with 3:2 aspect ratio, you can select a 3:2 aspect ratio picture size in <i>Settings > General camera settings > Picture resolution</i> .
Widescreen 16:9	Typical aspect ratio of widescreen films. As explained before, if you want to shoot directly in 16:9 format, select a 16:9 aspect ratio picture size in Settings. In that case, no crop guides will be necessary, as the viewfinder will accommodate a 16:9 preview in your device screen (since most devices have 16:9 aspect ratio screens, the typical black bands of surrounding the preview will go away, and the on-screen buttons will show on top of the preview).
Widescreen 16:9 (upper part)	The option Widescreen 16:9 uses the central part of the native shooting resolution to show the guides. You can align the 16:9 crop to the top by selecting this option.
Widescreen 16:9 (lower part)	The same as the previous option, but the crop area is at the bottom of the native frame.
Cinema 2.35:1	This option shows the typical cinematic aspect ratio.
Widescreen multiformat (grid for cinema)	Two crop guides (widescreen 16:9 and cinema 2.35:1) are shown simultaneously. In this option, the grid is adapted to the 2.35:1 area.
Widescreen multiformat (grid for 16:9)	Two crop guides (widescreen 16:9 and cinema 2.35:1) are shown simultaneously. In this option, the grid is adapted to the 16:9 area.

Live histogram



The histogram is a powerful guide to evaluate a photo exposure.

A histogram is a graph that counts how many occurrences of a particular brightness channel has. In case of color photos, there are three color channels (red, green and blue) each with its own intensities, whereas in black and white images there's only one luminance channel. Also, even with color images, you can opt to get a luminance-only histogram. Internally, the picture is converted to grayscale to calculate the histogram.

Activating the live histogram

Go to **Settings > Viewfinder > Live histogram** and activate **Show histogram**. The histogram is calculated in real time and changes when you move the camera or the subject, or you change settings that affect the lightning or color distribution.

Histogram types

In **Settings > Viewfinder > Live histogram > Histogram type** you can select:

- **RGB (3 color channels).** This option is only available when taking color photos.
- **Luminance.** This option is also available when taking color photos. It shows the luminance histogram of the viewfinder converted to grayscale.

Furthermore, you can adjust the size of the graphs in **Histogram size (Normal and Mini)** and the style of the histogram in **Histogram style (Transparent or Solid)**.

Photo organization

Whether you are a prolific shooter or not, you may want to set your rules on how photos are organized inside your smart device running Camera FV-5. Normally all photos are put into a folder with a file name. With Camera FV-5 you can change both the storage folder and the file naming scheme.

Storage folders

To change the storage folder, go to *Settings > Photo encoding settings > Photo storage & Numbering > Storage location*. There you can choose the following options:

- **DCIM folder.** Photos will be saved to <Internal memory storage>/DCIM folder.
- **DCIM/CameraFV5 folder.** Photos will be saved to <Internal memory storage>/DCIM/100_CFV5 folder. That is the default option.
- **Custom location.** You will be required to provide a custom folder in the Custom storage folder setting. If you don't set that setting, DCIM/CameraFV5 option will be used instead.

In *Settings > Photo encoding settings > Photo storage & Numbering > Custom storage folder* you can set a custom folder to store your pictures (remember to set the Storage location setting to Custom location). A folder browser will open that will let you navigate around your folder structure. Tap Select to define the current selected folder as the storage folder.

Note

There's no universal location of the external SD card location. As the internal memory, the external SD card is shown on the device file system as a normal

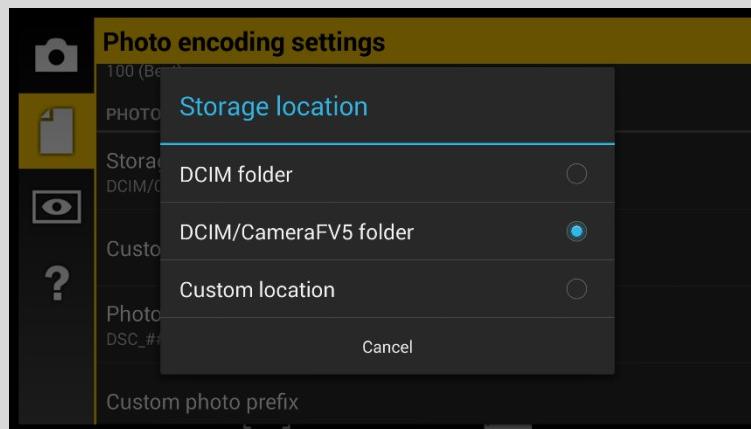
folder. Usually is called *externalSD* or *extSdCard*, and its location varies across devices (*/sdcard/* or */mnt/* folders are typical but not the only ones).

File names

By default, photos are named according to the DCIM standard (photos stored in a folder with the session number with 3 digits and a 5 letters suffix, 100_CFV5, and photos named with a 4 letters prefix and 4 digits counters, DSC_0001.JPG). That is the standard that follows most compact digital cameras and all DSLR cameras. It allows printers and other devices to automatically locate sessions and photos. However, you might want to change the file names to suit your needs, although they don't follow the DCIM standard any longer.

Custom prefixes

In *Settings > Photo encoding settings > Photo storage & Numbering > Photo numbering pattern* you can set the file name to one of the following patterns (all of them complying with the DCIM standard):

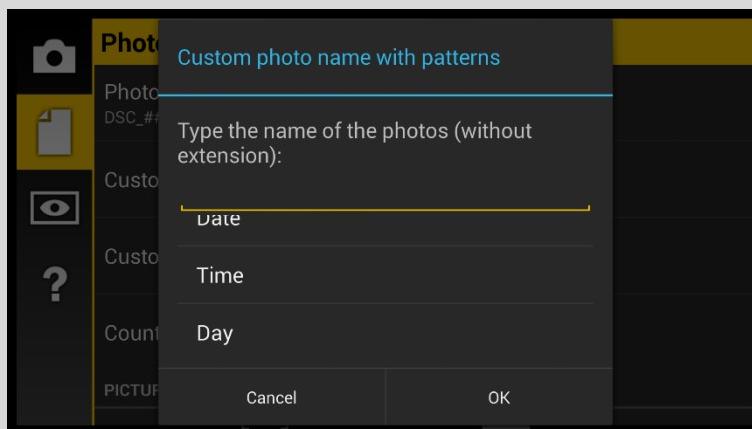


- **DSC_####.JPG**
- **DSC0####.JPG**
- **IMG_####.JPG**
- **PICT####.JPG**
- **Custom.** This one lets you customize the prefix with the 4 letters of your choice (for instance your initials or the four first letters of your name). After setting this option, tap on the Custom photo prefix setting and type the 4 letters of the prefix. If you provide less than 4, the prefix will be padded with underscores ("_") to fill 4 letters, and if you provide more, the first 4 will be taken.

- **Custom with patterns.** More on this on the next section.

Custom file names with patterns

If need more customization of the file naming scheme, you can select the option Custom with patterns in the setting Photo numbering pattern. Then, go to Custom photo name with patterns option and another panel will open. Tap on Custom photo name with patterns to compose your own pattern.



The file name pattern is composed of fixed and dynamic text. For instance, the file naming scheme **DSC_####.JPG**, has a fixed part ("DSC_") and a dynamic part (the photo counter).

The dynamic part of the name pattern is specified with placeholders, which are pieces of special text that are replaced with their corresponding values in the moment of saving the picture (when the file name is created). Those special pieces of text (placeholders) are written between angle brackets and are:

- **<date>**. Prints preformatted date. E.g. 2001-12-31.
- **<time>**. Prints preformatted time. E.g. 13-20-20.
- **<day>**. Prints the current day with 2 digits. E.g. 31.
- **<month>**. Prints the current month with 2 digits. E.g. 12.
- **<year>**. Prints the current year with 2 digits. E.g. 01.
- **<year4>**. Prints the current year with 4 digits. E.g. 2001.
- **<hour>**. Prints the current hour with 2 digits in 24-hours format. E.g. 13.
- **<minute>**. Prints the current minute with 2 digits. E.g. 20.
- **<second>**. Prints the current second with 2 digits. E.g. 20.
- **<counter>**. Prints the current photo counter with 4 digits. E.g. 0001.

Furthermore, it is possible to control the case (uppercase or lowercase) of the file extension in this mode by using the option **Use lowercase extension**.

Some examples of custom patterns:

- <date>_<time> would produce **2001-12-31_13-20-20**.
- <day><month><year><hour><minute><second> would produce **311201132020**.
- **CAMERA<counter>** would produce **CAMERA0001**.

Note

In the case that two file names collide because the patterns defined are not specific enough or change during the time, Camera FV-5 automatically adds an extra number of 4 digits to prevent the new file to overwrite the old one. That counter will be increased as much as needed to prevent always file name collision. You might want to design the file name pattern in a way that avoids collisions so that Camera FV-5 doesn't need to add an extra, non-configurable counter.

Intervalometer

The intervalometer can be used to take automated picture series at a regular time interval. One of the uses of the intervalometer is to create timelapses, but it has other uses as well.

Usage and configuration

The intervalometer is located under the  INT button at the left side of the  viewfinder, under the icon pictured as .



To start the intervalometer, you need to setup the seconds between shots and the total number of shots, tapping on the plus icon. A number picker dialog will pop up in both cases. To start the intervalometer, tap **Start now**. Then, the intervalometer dialog will disappear, and a toolbar will appear with information about the progress (current shot/total shots) and the expected remaining time based on the specified time interval. Two buttons let you pause/resume the intervalometer, and stop it.

All settings are available when taking photos with the intervalometer. Even more, if exposure bracketing is enabled when starting the intervalometer, all the bracketed exposures will be taken and they will count as one shot for the intervalometer. You can use this feature to create HDR timelapses by grouping bracketed exposures taken during an intervalometer session.

Important

If the time interval between shots is shorter than the time needed to create the shot(s), one or more picture slots will be omitted, effectively lowering the number of pictures finally taken. Take care to properly measure/calculate the time needed to create the shot(s), specifically when exposure bracketing is activated.

Note

Settings desired for the picture series, specifically picture focus, must be set prior starting the intervalometer. When the intervalometer starts, the AF is not triggered. However, you can still tap on the viewfinder to manually trigger the AF system while the intervalometer is running. Focus misadjustments can affect the subsequent pictures. To avoid accidental focus changes during intervalometer operation, activate the focus lock (AF-L).

Producing videos out of pictures

Currently Camera FV-5 does not include built-in functionality to produce videos from the pictures taken with the intervalometer functionality. Therefore, if your purpose is to build a timelapse video with the pictures taken with the intervalometer, you need another application for either Android or desktop computer.

Although application for mobile devices might exist to produce such timelapse videos, a full-fledged application for desktop computers is still recommended.

Some of the reasons a desktop computer is a better options are:

- Mobile devices have limited memory and serious power constraints. Therefore applications built for mobile devices are usually optimized with those constraints in mind. Optimizing an application for mobile devices is always a tradeoff of quality. Applications sacrifice quality in order to meet power and memory constraints. On mobile devices you would expect a video to be produced in a few seconds, but it normally takes minutes to hours on full-fledged desktop computers, with a lot of available memory and power. This is because computer software doesn't sacrifice quality for speed (or you can always choose to go for speed, but at least you have the choice to go for quality or this is the default option).
- You might want to do additional post-editing on your captures pictures before producing the timelapse, like cropping the picture, leveling it, adjusting colors or doing something more complex like inpainting to remove undesired objects or image stabilization. Although it is theoretically possible on mobile devices, most post-production image editing apps lack batch processing features, therefore makes the processing of multiple pictures simply not possible or realistic.
- If you are aiming at a professional production, you'll want to take time to produce a good timelapse video. Therefore it is always a good option to spend more time with a computer than trying to accomplish everything with a mobile phone.

Most video software and NLEs (non-linear editors) let you import picture series as video clips. Commercial software like Sony Vegas and Adobe After Effects are suitable for this, as well as VirtualDub among the free alternatives, but the same applies to other software. For this to work, it is important to use sequential file naming for images produced, since most software relies on this to determine the files that form part of the same clip.

Automatic exposure bracketing

Camera FV-5 has a built-in exposure bracketing feature. Bracketing means taking multiple shots varying some parameters between them. Therefore, exposure bracketing produces multiple shots with different exposures. On other DSLR cameras, this feature is known as BRK or AEB (auto exposure bracketing).

Exposure bracketing is useful to:

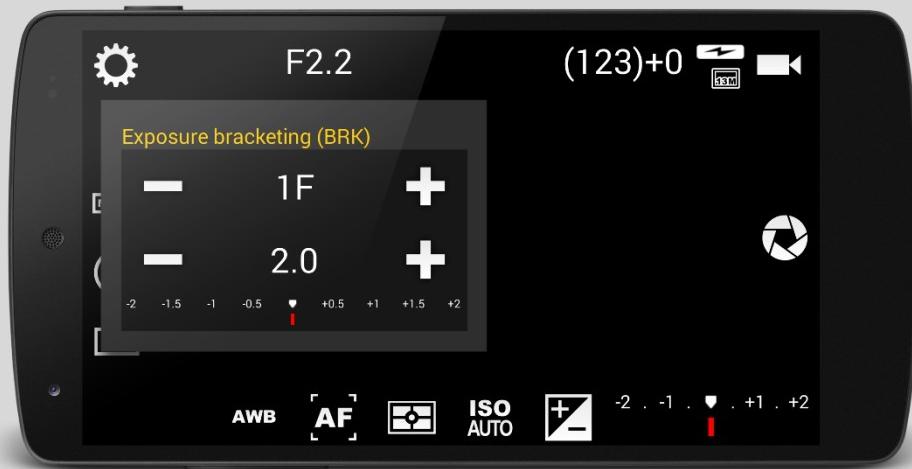
- Capture a photo with good exposure when you don't know the correct exposure beforehand, or you think that you would need to change the exposure after taking the photo.
- Capture a broader dynamic range scene: either you can expose for a bright area or a dark area but not both. Later, with the bracketed pictures, you can make a HDR picture on the computer, or using other applications.

This is the Camera FV-5 interface, when bracketing is not activated:



Notice the exposure meter on the lower right corner. The red mark shows the current exposure compensation. At +0 EV, the exposure is at the automatic metered speed.

Now, tap on [MENU] icon at left bar, then BRK. The bracketing settings dialog will open:



The dialog contains the following settings:

- Number of shots. Is the total number of shots to be taken. You can take from 3 up to 7 frames. You can tap on the + and - buttons to increase/decrease the number of bracket frames. In the display you will see either 1F, 3F, 5F or 7F, depending the number of frames. 1F means bracketing is disabled.
- Exposure step. Is the exposure compensation step between frames. The smallest EV step is device dependant, but a typical value is half stop (0.5). However, there are devices with 1/3 EV and 1/6 EV step too.

Note

With exposure compensation.
Exposure compensation affects the exposure compensation of the central photo, and hence the rest of the bracketed photos. EV compensation plus bracketing lets you to take multiple dark or multiple bright pictures, depending of the sign and magnitude of the EV shift.



When you are done adjusting the number and step of the bracketed pictures, dismiss the dialog by tapping outside it. Check the number and exposure of the pictures to be taken on the exposure meter at the lower right corner.

What you can do with the photos taken with BRK

Mainly two things:

Take the best of them

If you are in a hurry and you face a scene with high contrast, you might find adjusting the exposure compensation all the time cumbersome. Having Camera FV-5 take for instance 5 photos with different exposures can be handy, as you can later pick the best exposed photos.

HDR (High Dynamic Range) photos

If you cannot decide which photo is better exposed from a set of bracketed ones, why don't keep the best parts of each? That's the concept of HDR photos. You take multiple photos with different exposure times, and then you merge them into one with the best exposed areas of each one. Although there are applications that do this process on the phone, there are quality compromises being done by the restrictions imposed by mobile platforms (memory, processing power and battery drain). The best option is to do this processing on the computer. There are plenty of software options for both PC and Mac available for this task, among them:

- Photomatix. <http://www.hdrsoft.com/>
- Dynamic Photo-HDR. <http://www.mediachance.com/hdri/index.html>
- Luminance HDR. <http://qtpfsgui.sourceforge.net/>

Things that can go wrong with automatic exposure bracketing, and how to solve them

All shots come out with the same exposure

In this case, probably your device does not change exposure compensation instantly and Camera FV-5 leaves not enough time for the exposure to adapt. You can introduce a delay in *Settings > General camera settings > Compatibility > Pause between exposures*. You can also set the setting **Pause duration** to either **Short** or **Long**.

Photos are out of focus, specially after the first one

Some camera hardware reset the focus after taking a shot. You can force in that case Camera FV-5 to refocus after each shot. To do that, activate *Settings > General camera settings > Compatibility > Refocus after every shot*.

Bracketing does not work (nothing seems to happen)

If bracketing doesn't seem to work and it is nothing related with the previous two possible problems, follow the next checklist:

1. You are in program mode (**P** icon at left side of the viewfinder). In **speed priority mode (S)** the bracketing settings are disabled (you are setting the shutter speed in this mode, so you cannot override this parameter).
2. You are using **ISO AUTO**. It might happen that, when exposure time is limited, ISO is needed to compensate the exposure. If ISO is not set to AUTO, this won't be possible, and you will get some (or all) shots with the same exposure.
3. Be sure to set at least 3 frames (**3F** is shown in the upper display) in the bracketing settings. When **1F** is displayed, means bracketing is disabled.
4. Be sure to set at least one EV step increment (the lower display should be different than **0.0**). If the increment is **0.5**, you can set it to **0.5, 1.0, 1.5**, etc.
5. Check the number of frames to be bracketed at the lower exposure meter display. The red mark denotes the central frame, whereas the white marks denote the bracketed frames (darker/brighter). If you see only one red mark, that means that bracketing is disabled (see points 2 and 3).
6. Also, check that there is enough exposure compensation range for the bracketed frames to be taken. That is: if your camera have an exposure compensation range of **[-2, +2]**, in **0.5** steps, and you have set the exposure compensation to **-1**, for instance, you have set the BRK step to **2.0** (the maximum), and you try to change **1F** to **3F**, the resulting compensation would be **-3, -1** (the current EV compensation) and **+1**, and of course, your camera negative EV compensation reach only **-2**, so the **-3** compensation is out of range, that's why Camera FV-5 won't let you to change to **3F** in that situation (you will need to change EV to 0 to bracket 3 frames with **2.0** step).

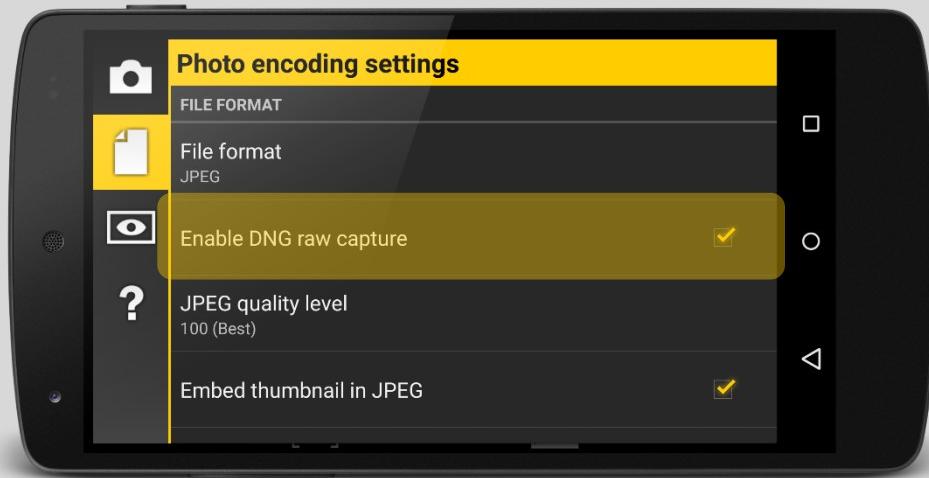
RAW photo capture

Beginning with version 2.2, Camera FV-5 while running under compatible Android 5.0 Lollipop devices, can shoot true RAW photos with up to 16-bit per color channel, as well as the usual JPEG. RAW photos are stored in the industry-standard DNG files (Adobe Digital Negative). RAW photographs store exactly the information as it was captured by the sensor, with no processing applied. Therefore, you can extract a lot of detail from the RAW image, and also you can process it to your liking, adjusting exposure from a greater dynamic range source, adjusting white balance, and applying any kind of noise reduction algorithm, just to name a few.

How to enable RAW capture

First, ensure that you have Camera FV-5 2.2 or newer. If your phone supports RAW capture and you are running, follow these steps to enable RAW capture.

1. Open the **Settings** panel (tap on the cog icon on the top left corner of the screen).
2. Select the **Photo encoding settings** tab (2nd).
3. Enable the option **Enable RAW capture**.



When you enable RAW capture, you will get JPEG+DNG (i.e. both developed and raw images). The RAW photos are stored as DNG files. The file names match the ones of the JPEG files that you can completely customize. Also, DNG files are stored on the same folder used to store the JPEG images, and you can choose any folder on your internal memory to store your pictures.

Note

RAW images are processed in the background, and take substantially longer to write, since the raw image sizes are considerably bigger than JPEG images.

Considerations with RAW capture

When shooting in RAW, consider the following.

- RAW images are considerably bigger than JPEG or PNG images, and therefore they take much longer to write, and take much more space from the selected storage.
- RAW images contain the same EXIF information present in JPEG images.
- RAW images have no processing, that means that any post-processing that Camera FV-5 does to pictures are not applied to RAW images. Specifically:
 - Digital zoom takes no effect. Digital zoom means cropping and stretching the image to simulate zoom. RAW images

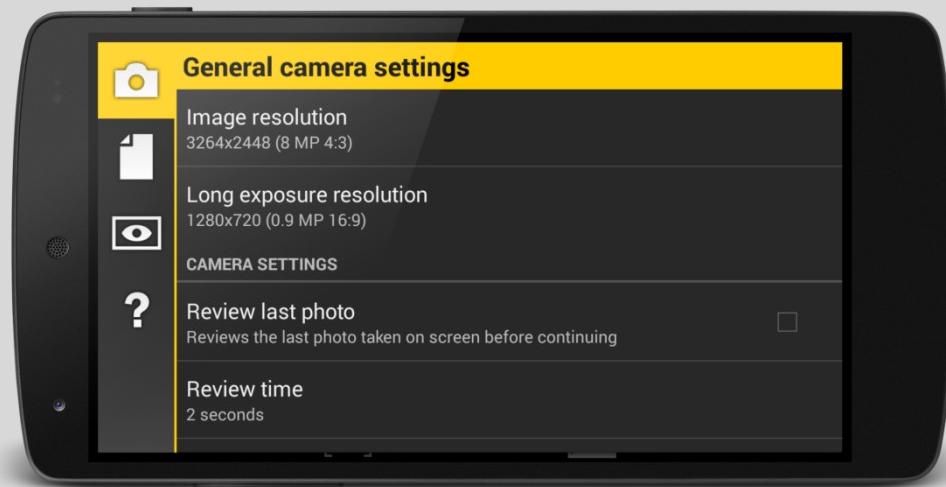
contain exactly what the sensor sees, and therefore digital zoom is not present in RAW images.

- White balance. White balance is applied in post-processing. However, the DNG metadata contains the white balance preset used in Camera FV-5 in the moment of capture, and therefore the RAW converter software will apply the same white balance preset that Camera FV-5 used by default. However, the white balance is still applied in post-processing, meaning that the recorded image itself does not contain this processing.
- The RAW image, as an exact copy of the sensor data, follows always the sensor orientation (i.e. landscape). However, the orientation is recorded in the DNG metadata, and it is up to the RAW converter to honor this orientation when converting the DNG image.

Settings reference

The settings panel, accessible by tapping on the gear icon  on the top left corner of the screen, reveals much of the functionality of Cinema FV-5. The options are divided on three tabs: **General camera settings**, **Photo encoding settings** and **Viewfinder**.

General camera settings



General camera settings

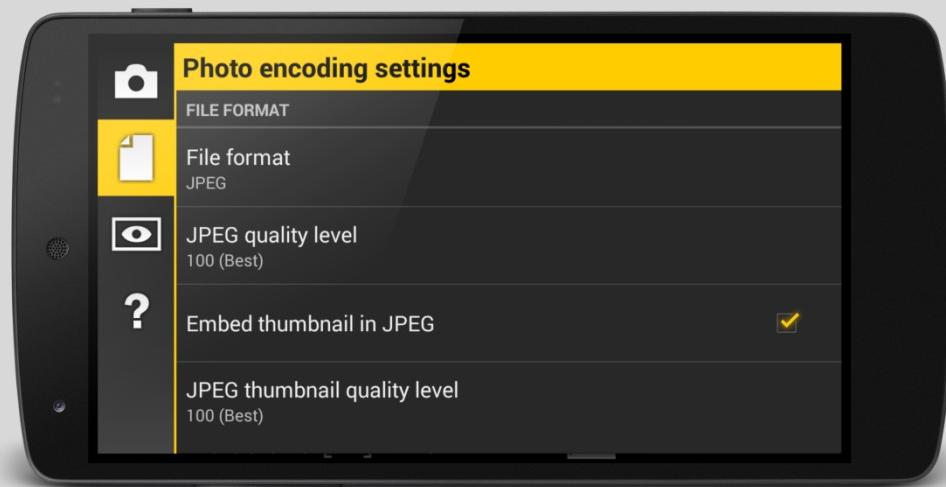
Image resolution

Photo still image resolution. This list varies with the device and the imaging

	<i>sensor. The different aspect ratios available are also device-dependent.</i>
Long exposure resolution	<i>Image resolution for long exposure shots. This only applies to pre-Lollipop long exposure system. In Android 5 Lollipop, images are taken in long exposure at full resolution if the device supports it.</i>
Camera settings	
Review last photo	<i>If enabled, displays the taken photo before continuing.</i>
Review time	<i>Selects the time for automatic photo review.</i>
Focus before capturing	<i>If focus is not acquired, focus the picture before taking a photo.</i>
Allow taking a photo without focus	<i>If disabled, photo capturing will be cancelled if focus failed.</i>
Antibanding	<ul style="list-style-type: none"> • Automatic • 50 Hz (Europea) • 60 Hz (USA) • Disable
Sound	
Play camera sounds	<i>Plays the camera sounds that the own application produces (shutter and focus confirmation/error). It might happen that, for security reasons or privacy enforcement, the camera controller plays another sounds during capture. In this case it won't be possible to silence such sounds, since they are not produced by the app.</i>
Camera sounds volume	Low, Medium (default), High.
Hardware controls	
Volume keys function	<ul style="list-style-type: none"> • None (default) • Shutter/focus • EV+/EV- • ISO+/ISO- • WB color temperature warmer/colder • Bracketing increase/decrease frames • Bracketing increase/decrease step • Digital zoom +/- • Next/previous grid • Next/previous crop guide

Invert volumen keys	<i>Interchange volume keys assigned buttons (i.e. volume up function will be assigned to volume down key and viceversa).</i>
Compatibility	
Keep AE-L/AWB-L after focus and shoots	<i>Enable this option if the device doesn't keep the AE/AWB lock after taking photos.</i>
Pause between exposures	<i>Enable this option if the device produces bracketed pictures with the same or similar exposure.</i>
Pause duration	<ul style="list-style-type: none"> • Short • Long
Refocus before every shoot	<i>Enable this option if the device produced bracketed photos with wrong focus after the first shot.</i>
Other	
Use double back key press mechanism	<i>If enabled, the app requires pressing the back key twice to exit the app to avoid accidentally closing it.</i>
Prefer external applications	<i>Use external applications instead of internal equivalent ones (i.e. look for alternative installed video recording applications instead of using Cinema FV-5 if available).</i>

Photo encoding settings

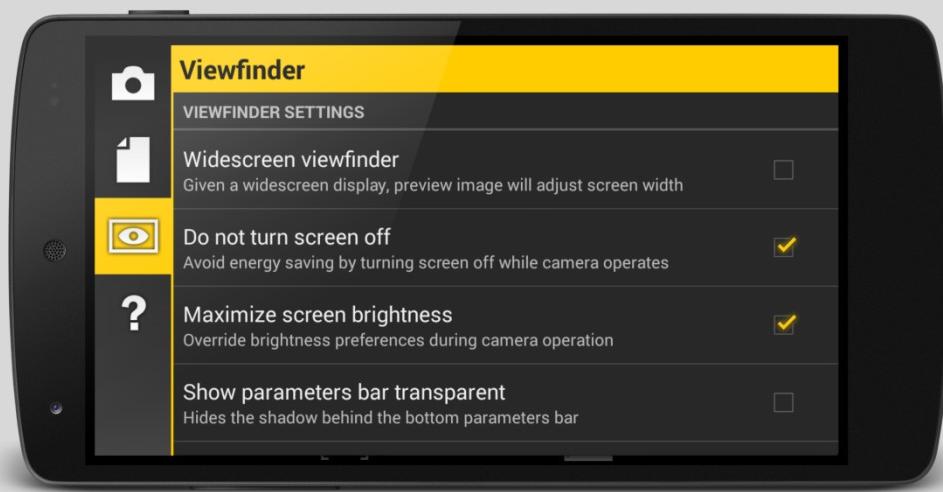


File format

File format	<ul style="list-style-type: none"> • JPEG (default) • PNG
Enable DNG raw capture	<i>If enabled, a DNG image will be produced in addition to the JPG image (that is, a developed JPG image and a raw image in DNG format). Both versions of the same image will have the same base file name.</i>
JPEG quality level	<ul style="list-style-type: none"> • 100 (best, default) • 95 (Superfine) • 90 (Fine) • 85 (basic) • 75 (Draft)
Embed thumbnail in JPEG	<i>Default</i>
JPEG thumbnail quality level	<ul style="list-style-type: none"> • 100 (best, default) • 95 (Superfine) • 90 (Fine) • 85 (Basic) • 75 (Draft)
Photo storage & numbering	
Storage location	<ul style="list-style-type: none"> • DCIM folder • DCIM/CameraFV5 folder (default) • Custom location
Custom storage folder	<i>A dialog will pop up to select the custom storage folder. This configuration is mandatory if you select "Custom location" in the previous option. Otherwise, this option won't have any effect on "Storage location" option set to other than "Custom location".</i>
Photo numbering pattern	<ul style="list-style-type: none"> • DSC_#### (default) • DSC0#### • IMG_#### • PICT_#### • Custom (XXXX####)
Custom photo prefix	<i>A dialog will pop up to choose a custom photo file name prefix.</i>
Custom photo name with patterns	<ul style="list-style-type: none"> • Custom photo name with patterns • Use lowercase extension
Counter options	<i>Shows the current photo counter value, and lets you reset it back to zero.</i>
Picture orientation	
Rotate pictures	<i>If enabled (default), produces JPG photos that contain an orientation tag that makes image viewers display the photos in the</i>

	<i>correct orientation (all photographs are physically stored in the natural sensor orientation).</i>
Rotation correction	<ul style="list-style-type: none"> • None (default) • + 90 grados (clockwise) • - 90 grados (counterclockwise) • + 180 degrees • + 180 degrees (only for portrait)
Image parameters	
Set image parameters	<ul style="list-style-type: none"> • Contrast • Saturation • Sharpness <p><i>(Support for those parameters depend on each device. It might happen that altering those parameters produces no effect on the final picture.)</i></p>
Color Channels	
	<ul style="list-style-type: none"> • RGB (default) • Luminance (black and white)
Metadata	
Embed metadata	<ul style="list-style-type: none"> • EXIF (JPG)/ XMP sidecar (PNG) • EXIF+XMP (JPG)/XMP sidecar (PNG) • EXIF only
Geotagging	<ul style="list-style-type: none"> • Use GPS only, if enabled • Use GPS, coarse location otherwise • Coarse location, if available • Do not generate location tag (default)

Viewfinder



Viewfinder settings	
Widescreen viewfinder	<i>Given a widescreen display, the viewfinder will be adjusted to the screen width.</i>
Do not screen off	<i>Avoid energy saving by turning screen off while camera operates.</i>
Maximize screen brightness	<i>Overrides system brightness preferences during camera operation.</i>
Show parameters bar transparent	<i>Hides the shadow behind the bottom parameters bar.</i>
Viewfinder orientation	<ul style="list-style-type: none"> • Landscape (default) • Automatic landscape reverse landscape (automatically changes app orientation based on the orientation sensor)
Viewfinder overlays	
Show stops display	<i>Enabled by default. Shows exposure compensation and bracketing settings on top of the viewfinder.</i>
Show camera parameters	<i>Enabled by default. Shows aperture, exposure time and ISO value on top of the viewfinder.</i>
Live exposure and ISO metering	<i>Displays updated exposure and ISO readings after parameter changes (only on supported devices).</i>

Shows photos in buffer	Enabled by default. <i>Shows number of photos pending to be written to the memory card.</i>
Show battery indicator	Enabled by default.
Live histogram	
Show histogram	<i>Shows a live histogram over the viewfinder.</i>
Histogram type	<ul style="list-style-type: none"> RGB (3 color channels, default) Luminance
Histogram size	<ul style="list-style-type: none"> Normal (default) Mini
Histogram Style	<ul style="list-style-type: none"> Transparent (default) Solid
Overlays	
Composition grid	<ul style="list-style-type: none"> None (default) Rule of thirds One quarter Crosshair Triangles (top-left/bottom-right) Triangles (bottom-left/top-right) Golden spiral (top right) Golden spiral (bottom right) Golden spiral (top left) Golden spiral (bottom left)
Grid thickness	<ul style="list-style-type: none"> Thin (default) Thick Thicker
Crop guides	<ul style="list-style-type: none"> None (default) Square format (1:1) Classic 35mm (3:2) Widescreen 16:9 Widescreen 16:9 (upper part) Widescreen 16:9 (lower part) Cinema 2.35:1 Widescreen multifORMAT (grid for cinema) Widescreen multifORMAT (grid for 16:9)

Function compatibility table

Camera FV-5 is an application that have support for many features that are specific to certain devices or Android versions. Therefore, some of them may not be available on your device. On the following table you will find Android OS-dependent features, and on which OS version they can be used.

Feature	Android 2.2+	Android 4.0+	Android 5.0+
Touch focus	2		
Touch metering			
Auto-exposure lock, auto-white balance lock			
Face detection focus mode			
RAW capture			3
Manual focus			3
Live ISO and exposure metering			
Manual shutter speed		4	
Long exposure at full resolution			3
Aperture priority mode	4		5

² Only available for certain Samsung and HTC phones.

³ Requires the device to have support for this.

⁴ Only available for Samsung Galaxy Camera, Samsung Galaxy Camera 2, Samsung Galaxy S4 Zoom and HTC One (2014, M8) under Android 4.3+.

⁵ Only available for devices with aperture control (i.e. devices with blades that can control the aperture).

Still, certain manufacturers do not implement all features that every OS supports, so it might happen that despite having the minimum Android OS version, a feature is still not available in Camera FV-5.

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Camera FV-5

One app, all devices, endless possibilities

